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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/566,046	DOELLE ET AL.	
	Examiner	Art Unit	
	ANTHONY J. CALANDRA	1791	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 October 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *19-45* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *19-45* is/are rejected.

7)☒ Claim(s) *26-29* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Detailed Office action

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 11/25/2008 has been entered.

2. Claims 1-18 are canceled. Claims 19, 20, and 45 have been amended by the applicant. Claims 19-45 are currently pending.

Interview Summary

3. The examiner called attorney Max Garwood on 2/10/08 to clarify some of the language and claims of the instant application. Specifically the examiner questioned how in instant claim 19 the limitation "not utilizing any further machinery for homogenizing the fibrous stock" was compatible with the dependent claims 24 and 38 which included mixing elements. The examiner stated that mixing elements would "homogenize" the fibers with the added calcium oxide hydroxide. Mr. Garwood stated that the mixing step may not be considered to be part of the 'any further homogenizing'. Mr. Garwood further stated that the claim may be better written adding the term 'sequentially' such that no homogenizing occurs after the disperser unit. The examiner commented that there are many operations in the pulp and paper industry that could be considered homogenizing which would take place after fiber loading. The examiner sated that a 112 2nd rejection would still be made so that the applicant's comments could be placed on the written record.

The applicant is encouraged to give a summary of the conversation and/or correct the written record in the next office action.

Response to Arguments

4. Applicant's arguments filed 10/29/08 have been fully considered but they are not persuasive.

Applicant argues that KLUNGNESS has mixing operations that take place before the refiner [pg. 10 paragraph 1]. Applicant argues that mixing is a homogenizing reaction and therefore KLUNGNESS alone or in combination with any other reference fails to disclose the instant limitation of not having any further homogenization equipment.

The examiner does admit that there is a mixing operation and no intervening steps before the refiner/disperser of KLUNGNESS. However, because of the way the claims are written it is still unclear as to where mixing is allowed. In instant claims 24 and 38 the applicant claims both static and moving mixing devices. This conflicts with the applicant's arguments that "…together indicate that ***mixing and stirring*** operations, which are ***homogenizing operations***, occur apart from the refining step, ***contrary to the method*** of the present invention [pg. 10 paragraph 1]". This also conflicts with the call made to the applicant's attorney on 2/10/09 in which it was stated that mixing is not to be considered as part of the 'not utilizing any further machinery for

homogenization' limitation. Therefore the examiner has maintained the rejection until all 112 2nd issues are resolved.

Based on the applicant's prior art such as U.S. 2005/0000665 A1 DOELLE and how the instant drawing differs from said prior art, the examiner believes that the applicant's invention is as follows: The prior art drawing shows a mixer (12) followed by press (16) and balancing reactor (18). Subsequently the pulp entered into crystallizer (20). The instant drawing shows the mixer (16) to either disperser (80) or refiner (42) without any intervening press and balancing reactor. In the case of the disperser there is an additional CO2 mixer (22). Therefore the examiner believes that the applicant's actual invention is the elimination of a press (16) and balancing reactor (18) after the final chemical mixer and but before the disperser/refiner.

To further advance prosecution, the examiner has added a new additional reference, HEISE. HEISE teaches a fiber loading process. There is no disclosed homogenization of the pulp after the disperser disclosed. The calcium oxide/hydroxide and carbon dioxide are all added with the pulp to the disperser, and therefore there would be no additional homogenizing equipment before the disperser for homogenizing the fiber and calcium oxide (arguments dated 10/29/08). HEISE additionally suggests an alternative embodiment that there can be a mixer before the disperser but no other equipment such as an equalization reactor between the chemical mixer and the disperser. This reference would cover all the possible interpretations of the applicant's claims including the examiner's interpretation of applicant's actual invention.

Double Patenting

5. Examiner acknowledges that the applicant awaits final disposition of copending cited documents before taking action on the double patenting issues.

Double Patenting rejections to 10/596313, 10/575541, and 10/577511 have been withdrawn as these cases have been abandoned.

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

6. Claims 19-45 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 7-53 of copending Application No.11/608029. Although the conflicting claims are not identical, they are not patentably distinct from each other because the claims of both applications claim loading fibers with calcium carbonate by adding calcium hydroxide or calcium carbonate to the fiber suspension and then introducing carbon dioxide and refining the stock. While the copending claims teach an intended

use and also washing the fiber, this does not preclude the one-way obviousness over the instant application.

As for claim 19, the copending application claims loading a fibrous suspension with calcium carbonate (*A method of loading a fibrous stock suspension containing chemical pulp* [see e.g. claim 7]). The copending application then claims adding aqueous or dry calcium hydroxide or dry calcium oxide (*fibers with calcium carbonate, comprising the steps of: adding one of calcium oxide and calcium hydroxide in one of a liquid form and a dry form into the fibrous stock suspension* [see e.g. claim 7]). The copending application further claims adding carbon dioxide and claims refining the fibers (*adding gaseous carbon dioxide into the fibrous stock suspension; precipitating of the calcium carbonate through said carbon dioxide; and refining of the fibrous stock suspension during said precipitating step* [see e.g. claim 7]).

As for claim 45, the copending application claims a device for loading cellulose fibers with calcium carbonate (*A fibrous stock suspension loading apparatus, comprising: a static mixer mixing calcium hydroxide into the fibrous stock suspension* [see e.g. claim 52]). The copending application claims a static mixer and a processing unit (*and at least one of a disperger and a refiner for one of fluffing and refining of the fibrous stock suspension and to precipitate the calcium hydroxide in a carbon dioxide atmosphere while creating fibers that are loaded with calcium carbonate in the fibrous stock suspension* [see e.g. claim 52]). The copending claim 52 does not state what the processing unit is but the method claim of copending claim 7 and 34 claim refiners, dispergers and fluffer FLPCC reactors.

Claim Objections

7. Claims 26-29 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form.

Claim 26 recites the limitation "FLPCC reactor" in line 2. In instant claim 19 the applicant choose a 'disperser' as the precipitation device (claim 19 line 6). Therefore the applicant is broadening the claim. The term refiner is acceptable in this case because a disperser also refines pulp.

Claims 27-29 are dependent on claim 26 and are similarly objected to.

Claim Rejections - 35 USC § 112

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claims 19-45 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claims 19 and 45 applicant recites the limitation 'not utilizing any further machinery for homogenizing the fibrous stock suspension' and 'not including any further machinery for homogenizing the fibrous stock suspension'.

It is not clear to the examiner from the claim, the specification, or the applicant's arguments what this limitation means. Therefore the examiner cannot determine the proper metes and bounds of patent protection desired by the applicant.

- The limitation could be read that there is no homogenizing equipment after the disperser.
- The limitation could be read as argued in 10/29/08 that there should not be any equipment before or after disperser [Arguments pg. 10 1st paragraph applicant argues that KLUNGNESS is not valid prior art because there is a mixing operation before the disperser].
- The second interpretation and arguments conflict with instant claim 24, 27, and 38.

Claims 20-44 are dependent on claim 19 and are similarly rejected.

Claim 26 recites the limitation "FLPCC reactor" in line 2. There is insufficient antecedent basis for this limitation in the claim. In instant claim 19 applicant choose a 'disperser' as the precipitation device (claim 19 line 6). Therefore the applicant is broadening the claim. The term refiner is acceptable in this case because a disperser also refines pulp,

Claims 27-29 are dependent on claim 26 and are similarly rejected.

Claim 29 recites the limitation "fluffer-FLPCC reactor" in line 3. There is insufficient antecedent basis for this limitation in the claim. In instant claim 19 applicant choose a 'disperser' as the precipitation device (claim 19 line 6). Therefore the applicant is broadening the claim. The term refiner is acceptable in this case because a disperser also refines pulp,

In instant claim 26 applicant states that the refiner, disperser, or fluffer is used as either a reactor or a static mixer. It is not clear to the examiner how the applicant is using the refiner or disperser as a static mixer because refiners and dispersers are rotating, not static equipment.

Claims 26-29 are dependent on claim 26 and are similarly rejected.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

9. Claims 19, 23-26, 28-30, 33, 34, 38-42 and 45 are rejected under 35 U.S.C. 102(b) as being anticipated by *Industrial Scale-up of Fiber loading of deinked Wastepaper* by HEISE, hereinafter HEISE.

As for claim 19, HEISE discloses adding calcium hydroxide and carbon dioxide into a fibrous stock suspension [Figure 1, abstract, pg. 898 column 1]. HEISE discloses that the disperser refines the pulp and that calcium carbonate precipitates on and in the fibers. In one embodiment HEISE does not disclose any mixing equipment before the disperser [Figure 1]. In another embodiment HEISE states that mixing equipment could be added before the disperser [pg. 899 column 2]. In both embodiments HEISE does not disclose any homogenizing equipment after the disperser [Figure 1].

As for claims 23, 28 and 29, HEISE discloses the dispersion unit which treats fiber at approximately 27% consistency [pg. 898 column 1].

As for claim 24, HEISE shows the calcium hydroxide being mixed added into a pipe before the dispersion system [Figure 1]. A pipe does not have any moving parts and is therefore static. The turbulence will cause mixing between the calcium hydroxide and the fibrous material, therefore the pipe acts as a static mixer.

As for claim 25, HEISE discloses the pulp as having 27% consistency (73% water) which the examiner has interpreted as moist [pg. 899 column 1].

As for claim 26, HEISE discloses the precipitation reaction occurs in a dispersion/refining unit [pg. 898 column 1].

As for claim 30, HEISE discloses dilution water to the fiber before the disperser [Figure 1]. Additionally, the pulp is necessarily diluted further when made into paper after loading. The examiner takes official notice that the headbox of a paper machine is run at a low consistency.

As for claims 33 and 34, HEISE discloses the temperature of 82 degrees C which falls within the instant claimed range [pg. 896 column 2].

As for claim 38, HEISE shows the calcium hydroxide being mixed and added into a pipe before the dispersion system [Figure 1]. A pipe does not have any moving parts and is therefore static. The turbulence will cause mixing between the calcium hydroxide and the fibrous material, therefore the pipe acts as a static mixer. Additionally the disperser unit of HEISE acts as rotating mixing equipment.

As for claims 39 and 40, HEISE discloses 69 kPa which falls within the instant claimed range [pg. 898 column 1].

As for claims 41 and 42, HEISE discloses the pH of 8.5 to 9.5 which falls within the instant claimed range [pg. 899 column 1].

As for claim 45, HEISE teaches the equipment that completes the process of claims 19 and 24 above, including a static mixer, a disperser, and no further machinery for homogenization.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

10. Claims 20-22, 27, 31, 32, 35, 43, and 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Industrial Scale-up of Fiber loading of deinked Wastepaper* by HEISE, hereinafter HEISE, in view of U.S. Patent Publication 2002/0007925 RHEIMS et al., hereinafter RHEIMS.

HEISE teaches a process for loading pulp. HEISE suggests that controlling parameters such as consistency and plate gap (which effects power) can affect the amount of calcium carbonate loading [pg. 899 column 2]. HEISE does not teach every variation of process

conditions. RHEIMS discloses a fiber loading process [abstract]. RHEIMS discloses that by changing individual process parameters the fiber loading process can be optimized [0028]. The form of the crystals affects the paper sheet's physical properties [such as brightness, luminosity, opacity, color, and light dispersion [0032]. At the time of the invention it would have been *prima facie* obvious to apply the known process conditions of RHEIMS to the fiber loading process of HEISE. A person of ordinary skill in the art would be motivated to do so to control the crystal forms paper physical properties and to optimize fiber loading [0032]. A person of ordinary skill would expect success of loading fibers with calcium carbonate by using the process parameters of RHEIMS.

In claims 20, 31, and 32, RHEIMS discloses both 0.5 to 9 kWh/t which overlaps with the instant claimed range [0046].

In claims 21, 22, and 27 RHEIMS discloses the consistency of 0.1 to 15% which overlaps with the instant claimed range [0056].

In claim 35, RHEIMS discloses spherical rhombohedral, and scalenohedral crystal shapes [0052].

In claims 43-44, RHEIMS discloses the treatment time of 6 seconds to one minute which overlaps with the instant claimed ranges [0044]

11. Claims 21, 27, 35-37 and 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Industrial Scale-up of Fiber loading of deinked Wastepaper* by HEISE, hereinafter HEISE, in view of U.S. Patent Publication 2002/0088566 DOELLE II, hereinafter DOELLE II.

HEISE teaches a process for loading pulp. HEISE suggests that controlling parameters such as consistency and plate gap (which effects power) can affect the amount of calcium carbonate loading [pg. 899 column 2]. HEISE does not teach every variation of process conditions. DOELLE II discloses calcium carbonate fiber loading [abstract]. DOELLE II discloses that by changing various process conditions the form of the calcium carbonate crystals can be controlled [0025]. The form of the crystals affects the paper sheet's physical properties [0007]. At the time of the invention it would have been *prima facie* obvious to apply the known process conditions of DOELLE II to the fiber loading process of HEISE. A person of ordinary skill in the art would be motivated to do so to control the crystal forms [0007] and to therefore control paper physical properties [0025]. A person of ordinary skill in the art would expect the crystals to form spherical, rhombohedral, and schalenohedral shapes and crystal sizes in the range of 0.5 to 5 micrometers.

In claims 21 and 27, DOELLE II discloses the consistency of approximately 15%-30% which overlaps with the instant claimed range [0089].

In claims 35-37, DOELLE II discloses spherical, rhombohedral, and schalenohedral shapes and crystal sizes in the range of 0.5 to 5 micrometers which falls overlaps with instant claimed ranges [0026-0027].

In claim 43, DOELLE II discloses 30 seconds to 6 minutes which overlaps with the instant claimed range [0027].

12. Claims 24 and 45 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Industrial Scale-up of Fiber loading of deinked Wastepaper* by HEISE, hereinafter HEISE, In view of, if necessary, U.S. Patent #4,943,349 GOMEZ, hereinafter GOMEZ.

As for claims 24, and 45, HEISE discloses all of the method limitations of claim 19 above and the equipment to perform said methods steps. HEISE shows the calcium hydroxide being mixed added into a pipe before the dispersion system [Figure 1]. A pipe does not have any moving parts and is therefore static. The turbulence will cause mixing between the calcium hydroxide and the fibrous material, therefore the pipe acts as a static mixer. Should the applicant be unconvinced, HEISE states that additional mixing may be beneficial [pg. 899 column 2]. GOMEZ discloses that for paper making fillers can be introduced to pulp by way of static mixers or by way of dynamic mixers (rotating mixer) [column 5 lines 19-30]. At the time of the invention it would have been obvious to a person of ordinary skill apply the known technique of mixing, such as static mixing to the known calcium carbonate precipitation method of HEISE. It is *prima facie* obvious to apply a known technique to improve a known device ready for improvement. A person of ordinary skill in the art would expect that a specialized static mixer would provide better mixing than a static piece of pipe.

13. Claim 19, 21-30, 38-40, and 45 are rejected under 35 U.S.C. 103(a) as being unpatentable by U.S. Patent #5,223,090 KLUNGNESS et al., hereinafter KLUNGNESS et al. in view of, *if necessary*, U.S. Patent #4,943,349 GOMEZ, hereinafter GOMEZ.

As for claim 19, KLUNGNESS et al. discloses two methods for adding calcium carbonate to fibers such as chemical pulped fibers (*A method of loading a fibrous stock*

suspension containing chemical pulp fibers with calcium carbonate). The first method takes place under low shear (low energy) mixing in a pressurized container and high consistencies [column 6 lines 64-68 and column 7 lines 1-5]. The second method takes place at lower consistencies and under high shear refining [column 7 lines 5-40].

KLUNGNESS et al. further teaches adding calcium oxide or calcium hydroxide with water to the fibers (*adding one of calcium oxide and calcium hydroxide in one of a liquid form and a dry form into the fibrous stock suspension* [see e.g. column 6 lines 8-15]). Carbon dioxide is then added to the suspension of fibers which undergoes refining to precipitate out calcium carbonate (*adding gaseous carbon dioxide into the fibrous stock suspension; precipitating of the calcium carbonate through said carbon dioxide; and refining of the fibrous stock suspension during said precipitating step.* [see e.g. column 7 lines 5-42].)

The examiner has interpreted the claim as only not allowing homogenization after the calcium oxide is added and before the fibrous suspension reaches the refiner (*not utilizing any machinery for homogenizing the fibrous stock suspension*).

KLUNGNESS discloses a mixer to mix the pulp suspension with the calcium oxide [column 7 lines 16-41]. Subsequent to mixing the calcium oxide the pulp is fed into a refiner which has a transfer screw [column 7 lines 15-41]. Examiner notes that this transfer screw only moves the fiber and does not homogenize it (a transfer screw is not a screw press). KLUNGNESS does not disclose a screw press or a conditioning machine subsequent to the calcium oxide/hydroxide mixing device and prior to the refiner. Therefore based on the examiner's first interpretation that no homogenizing is allowed between the calcium oxide

mixing and the refiner, KLUNGNESS clearly meets this limitation as the pulp is only mixed with calcium oxide and then sent to the refiner with no intervening steps.

The second possible interpretation of the applicant's claim limitation is that a static mixer is not machinery for homogenizing. In this case it would have been obvious to a person of ordinary skill in the art to substitute a static mixer for the rotating mixer of KLUNGNESS. GOMEZ discloses that for paper making fillers can be introduced to pulp by way of static mixers or by way of dynamic mixers (rotating mixer) [column 5 lines 19-30]. At the time of the invention it would have been obvious to a person of ordinary skill in the art to substitute a rotating dynamic mixer for a static mixer of GOMEZ to achieve the predictable result of mixing the pulp with the calcium oxide. It is *prima facie* obvious to substitute one known component for another known equivalent component to achieve a predictable result.

As for claim 21, KLUNGNESS et al. discloses that the pulp consistency is between 5 and 15% which falls within the instant claimed range [column 7 lines 5-10].

As for claim 22, KLUNGNESS et al. discloses the overlapping range of 5 to 15% for refiner treatment [column 7 lines 5-10] which overlaps the instant claimed range. Examiner has interpreted the refiner consistency as indicative of the mixing consistency. KLUNGNESS et al. further teaches the specific point of 2% for a mixing consistency which falls within the instant claimed range [see e.g. column 8 lines 60-65].

As for claim 23, KLUNGNESS et al. discloses that the pulp consistency is between 5 and 15% [column 7 lines 5-10]. KLUNGNESS et al. further discloses that the pulp is mixed with calcium oxide and water to the desired consistency [see e.g. column 6 lines 8-15]. Since the consistency of refining is 5-15% the desired consistency would be the same as the refining

consistency. KLUNGNESS et al. further discloses that up to 50% by weight of cellulose of calcium hydroxide is added to the mixture. If the pulp slurry contains 5 grams pulp / 95 grams water and 50% calcium hydroxide is added than the total mixture by weight is 7.3%. If the pulp slurry contains 15 grams pulp and 85 grams water and 50% calcium hydroxide is added the mixture by weight would be ~21% solids by weight. Therefore the range of 7.3-21% solids of KLUNGNESS et al. anticipates the instant claimed range.

As for claim 24, KLUNGNESS et al. discloses that the calcium oxide or calcium hydroxide is mixed with the pulp [see e.g. column 6 lines 8-15]. KLUNGNESS et al. further discloses that on the bench scale the mixing takes place in a Hobart Mixer which the examiner has interpreted as an intermediate vat and mixed at low speed which the examiner has interpreted as a static mixer [see e.g. column 8 lines 35-40].

As for claim 25, KLUNGNESS discloses that the carbon dioxide is added to 5 to 15% stock [see e.g. column 7 lines 5-10]. Since the remainder of the stock is water the carbon dioxide has been added to a moist stock suspension.

As for claims 26-29, KLUNGNESS et al. further discloses a static mixer which mixes the components, the Hobart mixer, where the consistency is 2% which falls within the instant claimed range [see e.g. column 8 lines 35-40 and 64-66]. KLUNGNESS et al. also discloses a refiner is used as a reactor by causing shear which precipitates out the carbon dioxide, and also serves to mix the components for the 5 to 15% consistency pulp which falls within the instant claims [see e.g. column 7 lines 5-40]. KLUNGNESS et al. finally discloses a pressurized container, which the examiner has interpreted as the FPLCC reactor, where the consistency is

15% - 60% consistency, which is the instant claimed range [column 6 lines 64-69 and column 7 lines 1-5].

As for claim 30, KLUNGNESS et al. discloses that water is added during the calcium oxide addition step [see e.g. column 6 lines 8-15].

As for claim 38, KLUNGNESS et al. discloses a static mixer [column 6 lines 7-15 and column 8 lines 35-40]. KLUNGNESS et al. also discloses a refiner which has rotating components [see e.g. column 7 lines 5-40].

As for claims 39-40, KLUNGNESS et al. discloses the pressure range of 5 psig to 50 psig, which is 0.34 to 4 bar, and falls within both instant claimed ranges [see e.g. column 7 lines 1-5].

As for claim 45, KLUNGNESS et al. discloses an apparatus with a mixer for mixing in calcium oxide/hydroxide [see e.g. column 6 lines 8-15 and column 8 lines 35-40] and a refiner which refines the stock and precipitates out calcium carbonate by using the mixed calcium oxide and injected carbon dioxide [column 7 lines 5-40] which loads the fibers with calcium carbonate [see e.g. abstract].

The examiner has interpreted the claim as only not allowing homogenization after the calcium oxide is added and before the fibrous suspension reaches the refiner (*not utilizing any machinery for homogenizing the fibrous stock suspension*).

KLUNGNESS discloses a mixer to mix the pulp suspension with the calcium oxide [column 7 lines 16-41]. Subsequent to mixing the calcium oxide the pulp is fed into a refiner which has a transfer screw [column 7 lines 15-41]. Examiner notes that this transfer screw only moves the fiber and does not homogenize it (a transfer screw is not a screw press).

KLUNGNESS does not disclose a screw press or a conditioning machine subsequent to the calcium oxide/hydroxide mixing device and prior to the refiner. Therefore based on the examiner's first interpretation that no homogenizing is allowed between the calcium oxide mixing and the refiner, KLUNGNESS clearly meets this limitation as the pulp is only mixed with calcium oxide and then sent to the refiner with no intervening steps.

The second possible interpretation to the applicant's claim limitation is that a static mixer is not machinery for homogenizing. In this case it would have been obvious to a person of ordinary skill in the art to substitute a static mixer for the rotating mixer of KLUNGNESS. GOMEZ discloses that for paper making fillers can be introduced to pulp by way of static mixers or by way of dynamic mixers (rotating mixer) [column 5 lines 19-30]. At the time of the invention it would have been obvious to a person of ordinary skill in the art to substitute a rotating dynamic mixer for a static mixer of GOMEZ to achieve the predictable result of mixing the pulp with the calcium oxide. It is *prima facie* obvious to substitute one known component for another known equivalent component to achieve a predictable result.

14. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent #5,223,090 KLUNGNESS et al., hereinafter KLUNGNESS et al. in view of, if necessary, U.S. Patent #4,943,349 GOMEZ, hereinafter GOMEZ, as applied to claim 19 above, further evidenced by U.S. Patent # 5,478,441 HAMILTON, hereinafter HAMILTON.

As for claim 20 KLUNGNESS et al. clearly teaches refining the pulp at 10-70 watt-hrs/kg (10-70 kW-hrs/mt) which falls within the instant claimed range [column 7 lines 12-15]. KLUNGNESS et al. does not explicitly state that a disperger is being used. However,

dispergering is a type of refining. Furthermore, KLUNGNESS et al. does state that a 'devils tooth plate' is being used. A devils tooth plate is a type of disk surface that is used in a disperger as evidenced by HAMILTON [column 3 lines 1-15]. Alternatively, it would have been obvious to a person of ordinary skill in the art to use a disperger with the method of KLUNGNESS et al. for the reason that, both refiners and dispergers refine pulp, KLUNGNESS et al. states a devils tooth plate is useful and dispergers have this type of plate, and finally KLUNGNESS et al. states that any high shear mixing device may be used and it would have been obvious to try a known piece of high shear refining equipment such as a disperger.

15. Claims 43 and 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent #5,223,090 KLUNGNESS et al., hereinafter KLUNGNESS et al. in view of, if necessary, U.S. Patent #4,943,349 GOMEZ, hereinafter GOMEZ, as applied to claim 19 above, as evidenced by U.S. Patent 3,794,558 BACK, hereinafter BACK.

KLUNGNESS et al. discloses the residence time of the high consistency process to be 1 to 60 minutes [see e.g. column 7 lines 1 -5]. KLUNGNESS et al. does not explicitly state the residence time of the 5-15% consistency carbonate loading process in the refiner. However, refiners have low residence times as there is only a small volume which the pulp passes through. A typical refiner would have a residence time less than 10 seconds with a time of 0.3 to 3 seconds being typical [see e.g. column 5 lines 2-6] all times which fall within the instant claimed ranges. Alternatively a person of ordinary skill in the art would be motivated to optimize the time in the refiner to affect the amount of reaction and the amount of refining done by the refiner.

16. Claims 33-37 and 41-42 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent #5,223,090 KLUNGNESS et al., hereinafter KLUNGNESS et al. in view of, if necessary, U.S. Patent #4,943,349 GOMEZ, hereinafter GOMEZ, as applied to claim 19 above, and further in view of U.S. Patent Publication 2003/0010463 DOELLE, hereinafter DOELLE.

As for claim 33 and 34, KLUNGNESS et al. does not give guidance as to the temperature that the calcium oxide/hydroxide reaction with carbon dioxide should occur. DOELLE discloses that the carbon dioxide should be added at a temperature of -15 to 120 degrees C and preferably between 20 and 90 degrees C which are the instant claimed ranges [see e.g. paragraph 0031]. At the time of the invention it would have been obvious to a person of ordinary skill in the art to run the process of KLUNGNESS at the temperatures of DOELLE. A person of ordinary skill in the art would be motivated to combine the art of KLUNGNESS et al. and DOELLE because DOELLE describes the temperatures given as preferable to running the calcium carbonate reaction [paragraph 0031]. Applying a known temperature range of DOELL to the known device of KLUNGNESS et al. to obtain the predictable results of calcium carbonate loading would have been *prima facie* obvious.

As for claim 41-42, KLUNGNESS et al. does not give guidance as to the pH that the calcium oxide/hydroxide reaction with carbon dioxide should occur. However, calcium carbonate and calcium oxide are basic so an initial basic pH would be expected. DOELLE discloses that the pH should be 6 to 10 which overlaps is the instant claimed range of claim 40. DOELLE also discloses the preferred pH range of 7 to 8.5 which falls within the instant claimed range of claim 41 [see e.g. paragraph 0031]. At the time of the invention it would have been obvious to a person of ordinary skill in the art to run the process of KLUNGNESS at the pH of

DOELLE. A person of ordinary skill in the art would be motivated to combine the art of KLUNGNESS et al. and DOELLE because DOELLE describes the pH given as preferable to running the calcium carbonate reaction [paragraph 0031]. Applying a known pH range of DOELLE to the known device of KLUNGNESS et al. to obtain the predictable results of calcium carbonate loading would have been *prima facie* obvious.

As for claims 35-37, DOELLE discloses that the calcium carbonate forms rhombohedral, scalenohedral, and spherical shapes [see e.g. paragraph 0035]. DOELLE further discloses the crystal size of 0.05 – 5 micrometers and 0.3 – 2.5 micrometers which are the instant claimed ranges. It is the examiner's position, without evidence to the contrary that a person running the process of KLUNGNESS et al. using the conditions of DOELLE would also obtain crystals of the shape and size of DOELLE.

17. Claims 31-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent #5,223,090 KLUNGNESS et al., hereinafter KLUNGNESS et al. in view of U.S. Patent Publication 2002/0092636 RHEIMS et al. and Handbook for Pulp and Paper Technologists by SMOOK, hereinafter SMOOK.

As for claim 36 and 37, KLUNGNESS teaches that for the high shear refiner the energy should be 10 – 70 kWh/ton [see e.g. column 7 lines 5-15]. KLUNGNESS does not teach the energy added in the low shear reactor. KLUNGNESS further does not teach a power input of the range 0.5 to 8 kWh/t. RHEIMS et al. teaches the overlapping range of 0.5 to 9 kWh/t. At the time of the invention it would have been obvious to a person of ordinary skill in the art to use the energy range of 0.5 to 9 kWh/t. A person of ordinary skill in the art would be motivated to

combine the art of KLUNGNESS et al. and RHEIMS because RHEIMS gives a known power input for the calcium carbonate reaction [paragraph 0031]. Applying a known power range of RHEIMS to the known device of KLUNGNESS et al. to obtain the predictable results of calcium carbonate loading would have been *prima facie* obvious. Furthermore, a person of ordinary skill in the art would be clearly motivated to adjust the range of power input as the power applied to fiber effects the properties (such as tear and tensile) of said fibers [see e.g. SMOOK pg 206]. Therefore a person of ordinary skill in the art would want to optimize the energy input to obtain the fiber qualities that are desired.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ANTHONY J. CALANDRA whose telephone number is (571) 270-5124. The examiner can normally be reached on Monday through Thursday, 7:30 AM-5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven Griffin can be reached on (571) 272-1189. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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/AJC/

/Eric Hug/
Primary Examiner, Art Unit 1791